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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/089,026

07/02/2002

Pierre Siohan

F40.12-0005

9446

27367 7590 07/24/2008
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EXAMINER

PHUNKULH, BOB A

ART UNIT

PAPER NUMBER

2619

MAIL DATE

DELIVERY MODE

07/24/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/089,026	SIOHAN ET AL.	
	Examiner	Art Unit	
	BOB A. PHUNKULH	2619	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 April 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 and 11-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4,6,8,9 and 11-21 is/are rejected.
- 7) ☒ Claim(s) 5 and 7 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 April 2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This communication is in response to applicant's 04/28/2008 amendment(s)/response(s) in the application of **SIOHAN et al.** for "**METHOD FOR TRANSMITTING AN OFFSET MODULATED BIORTHOGONAL MULTICARRIER**" filed 03/26/2002. The amendment/response to the claims have been entered. No claim has been canceled. No claims have been added. Claims 1-9, 11-21 are now pending.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4, 6, 12, 15-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over *KOBER* et al. (US 6,252,535), hereinafter *KOBER*.

Regarding claim 1, *KOBER* discloses a method for transmitting a biorthogonal frequency division multiplex/offset modulation (BFDM/OM) biorthogonal multicarrier signal (intended used, therefore no patentable weight given) characterized in that it implements a transmultiplexer structure providing:

a modulation step, by a bank of synthesis filters (60a ...60n, see figure 4), the bank of filter having M parallel branches, $M > 2$, each fed by source data ($x_0(n) \dots x_{M-1}(N)$, see figure 4) and each comprising an expander of order M and filtering means (see col. 5 lines 35-49); and

a demodulation step, by a bank of analysis filters (44a...44n, see figure 4), the bank of synthesis filters having M parallel branches, each comprising a decimator of order M (64a...64n, see figure 4) and filtering means, and delivering representative data received from the source data (col. 3 lines 7-12),

the synthesis filters and analysis filters being derived from a predetermined prototype modulation function (the analysis and synthesis filters can be implemented in any number of ways depending upon the type of signal to be filtered, see col. 2 lines 53-67).

KOBER fails to explicitly disclose that each of both branches of analysis and synthesis filters comprises of a decimator of order M and the expander of order M. In another word, the number of parallel branches is double the order of the expander or the decimator.

In col. 5 lines 34-50, *KOBER* discloses that the downsamplers performing M-fold decimation, taking every M^{th} sample, and upsamplers performing sampling by filling zeros between each sample. Therefore, the subject matter "a decimator of order M" or "the expander of order M" is the sampling rate of the downsampler or the upsampler.

However, it would have been obvious to one having ordinary skill in the art at the time of invention was made to adjust the sampling rate of the downsampler 64a...64n or upsamplers 68a...8n in order to customized to user's or system's needs.

Regarding claim 2, *KOBER* discloses in that the filtering means of the bank of synthesis filters and/or of the bank of analysis filters are grouped as a polyphase matrix,

respectively (the analysis filters and synthesis filters are represented in a special form known as the Polyphase representation; see col. 3 lines 7-12; and col. 5 line 62 to col. 6 line 6).

Regarding claim 3, *KOBER* discloses at least one of the polyphase matrices comprises a reverse Fourier transform with $2M$ inputs and $2M$ outputs (a known transform, see col. 5 line 62 to col. 6 line 6).

Regarding claim 12, *KOBER* discloses a method for modulating a biorthogonal frequency division multiplex/offset modulation ('BFDM/OM) biorthogonal multicarrier signal, characterized in that it implements a bank of synthesis filters ($60a \dots 60n$, see figure 4), the bank of filter having M parallel branches, $M > 2$, each fed by source data ($x_0(n) \dots x_{M-1}(N)$, see figure 4) and each comprising an expander of order M and filtering means (see col. 5 lines 35-49), which is derived from a predetermined prototype modulation function (the analysis and synthesis filters can be implemented in any number of ways depending upon the type of signal to be filtered, see col. 2 lines 53-67).

KOBER fails to explicitly disclose that each branches of analysis filters comprises of a decimator of order M and the expander of order M . In another word, the number of parallel branches is double the order of the expander or the decimator.

In col. 5 lines 34-50, *KOBER* discloses that the downsamplers performing M -fold decimation, taking every M^{th} sample, and upsamplers performing sampling by filling

Art Unit: 2619

zeros between each sample. Therefore, the subject matter "a decimator of order M" or "the expander of order M" is the sampling rate of the downsampler or the upsampler.

However, it would have been obvious to one having ordinary skill in the art at the time of invention was made to adjust the sampling rate of the downsampler 64a...64n or upsamplers 68a...8n in order to customized to user's or system's needs.

Regarding claim 4, *KOBER* discloses it implements a reverse Fourier transform (a know transform) fed by 2M branches, themselves fed by the transmitted signal, and each comprising a decimator of order M followed by a filtering module, and feeding 2M phase shift multipliers, delivering an estimation of the source data (a known transform, see col. 5 line 62 to col. 6 line 6).

Regarding claim 15, *KOBER* discloses a method for demodulating a biorthogonal frequency division multiplex/offset modulation (BFDM/OM) biorthogonal multicarrier signal characterized in that it implements a bank of analysis filters (44a...44n, see figure 4), the bank of synthesis filters having M parallel branches, each comprising a decimator of order M (64a..64n, see figure 4) and filtering means, and delivering representative data received from the source data (col. 3 lines 7-12), the synthesis filters being derived from a predetermined prototype modulation function (the analysis and synthesis filters can be implemented in any number of ways depending upon the type of signal to be filtered, see col. 2 lines 53-67).

KOBER fails to explicitly disclose that each of both branches of analysis and synthesis filters comprises of a decimator of order M and the expander of order M . In another word, the number of parallel branches is double the order of the expander or the decimator.

In col. 5 lines 34-50, *KOBER* discloses that the downsamplers performing M -fold decimation, taking every M^{th} sample, and upsamplers performing sampling by filling zeros between each sample. Therefore, the subject matter "a decimator of order M " or "the expander of order M " is the sampling rate of the downsampler or the upsampler.

However, it would have been obvious to one having ordinary skill in the art at the time of invention was made to adjust the sampling rate of the downsampler 64a...64n or upsamplers 68a...8n in order to customized to user's or system's needs.

Regarding claim 6, *KOBER* it implements a reverse Fourier transform (a known transform) fed by $2M$ branches, themselves fed by the transmitted signal, and each comprising a decimator of order M followed by a filtering module, and feeding $2M$ phase shift multipliers, delivering an estimation of the source data (a known transform, see col. 5 line 62 to col. 6 line 6).

Regarding claims 8 and 13, *KOBER* fails to disclose the filters are belong to group comprising: one of transverse structure filters, ladder structure filters, or trellis structure filters. Examiner takes official notice that grouping filters one of transverse structure filters, ladder structure filters, or trellis structure filters is well known in the art

Art Unit: 2619

of filtering for providing efficient filtering means. Thus, at the time of the invention it would have been obvious to one of ordinary skill in the art to group the filters in KOBER as one of transverse structure filters, ladder structure filters, or trellis structure filters since such grouping of filters is well known in the art of filtering for providing efficient filtering means.

Regarding claim 16, *KOBER* discloses an apparatus comprising: a modulating device for modulating a biorthogonal frequency division multiplex/offset modulation (BFDM/OM) biorthogonal multicarrier signal, characterized by a bank of synthesis filters having $2M$ parallel branches, $M \geq 2$, each fed by source data and each comprising an expander of order M and filtering means, the filtering means being derived from a predetermined prototype modulation function (the analysis and synthesis filters can be implemented in any number of ways depending upon the type of signal to be filtered, see col. 2 lines 53-67).

KOBER fails to explicitly disclose that each of both branches of analysis and synthesis filters comprises of a decimator of order M and the expander of order M . In another word, the number of parallel branches is double the order of the expander or the decimator.

In col. 5 lines 34-50, *KOBER* discloses that the downsamplers performing M -fold decimation, taking every M^{th} sample, and upsamplers performing sampling by filling zeros between each sample. Therefore, the subject matter "a decimator of order M " or "the expander of order M " is the sampling rate of the downsampler or the upsampler.

However, it would have been obvious to one having ordinary skill in the art at the time of invention was made to adjust the sampling rate of the downsampler 64a...64n or upsamplers 68a...8n in order to customized to user's or system's needs.

Regarding claim 17, *KOBER* it implements a reverse Fourier transform (a know transform) fed by 2M branches, themselves fed by the transmitted signal, and each comprising a decimator of order M followed by a filtering module, and feeding 2M phase shift multipliers, delivering an estimation of the source data (a known transform, see col. 5 line 62 to col. 6 line 6).

Regarding claim 18, *KOBER* discloses a demodulation device for demodulating a BFDM/OM biorthogonal multicarrier signal characterized by:

a bank of analysis filters (44a...44n, see figure 4), the bank of synthesis filters having M parallel branches, each comprising a decimator of order M (64a..64n, see figure 4, col. 3 lines 7-12),

the analysis filters being derived from a predetermined prototype modulation function (the analysis and synthesis filters can be implemented in any number of ways depending upon the type of signal to be filtered, see col. 2 lines 53-67).

Regarding claim 20, *KOBER* discloses a demodulation device for demodulation a biorthogonal frequency division multiplex/offset modulation (BFDM/OM) biorthogonal multicarrier signal comprising:

a bank of analysis filters (44a...44n, see figure 4), the bank of synthesis filters having M parallel branches, each comprising a decimator of order M (64a..64n, see figure 4, col. 3 lines 7-12),

the analysis filters being derived from a predetermined prototype modulation function (the analysis and synthesis filters can be implemented in any number of ways depending upon the type of signal to be filtered, see col. 2 lines 53-67).

KOBER fails to explicitly disclose that each branches of analysis filters comprises of a decimator of order M and the expender of order M. In another word, the number of parallel branches is double the order of the expander or the decimator.

In col. 5 lines 34-50, *KOBER* discloses that the downsamplers performing M-fold decimation, taking every M^{th} sample, and upsamplers performing sampling by filling zeros between each sample. Therefore, the subject matter "a decimator of order M" or "the expender of order M" is the sampling rate of the downsampler or the upsampler.

However, it would have been obvious to one having ordinary skill in the art at the time of invention was made to adjust the sampling rate of the downsampler 64a...64n or upsamplers 68a...8n in order to customized to user's or system's needs.

Regarding claims 19, 21, *KOBER* it implements a reverse Fourier transform (a know transform) fed by 2M branches, themselves fed by the transmitted signal, and each comprising a decimator of order M followed by a filtering module, and feeding 2M phase shift multipliers, delivering an estimation of the source data (a known transform, see col. 5 line 62 to col. 6 line 6).

Claims 9, 11, 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over *KOBER* in view of Applicant's Admitted Prior Art (AAPA).

Regarding claims 9, 11 and 14, *KOBER* fails to disclose the signal is an OFDM/OM signal.

AAPA discloses that it is well known in the art that OFDM/OM has the advantage of "operat[ing] without any guard interval and also provid[ing] a wider possibility of choice as regards the prototype function" (e.g., see applicant's specification at page 2, lines 8-18). Thus, at the time of the invention it would have been obvious to one of ordinary skill in the art to implement an OFDM/OM signal in *KOBER* in order to provide the well known advantage of "operat[ing] without any guard interval and also provid[ing] a wider possibility of choice as regards the prototype function" (e.g., see applicant's specification at page 2, lines 8-18).

Allowable Subject Matter

Claims 5, 7, are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

Applicant's arguments with respect to claims 1-4, 6, 8-9, 11-21 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any response to this action should be mailed to:

The following address mail to be delivered by the United States Postal Service (USPS) only:

Mail Stop _____
Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

or faxed to:

(571) 273-8300, (for formal communications intended for entry)

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Bob A. Phunkulh** whose telephone number is **(571) 272-3083**. The examiner can normally be reached on Monday-Tuesday from 8:00 A.M. to 5:00 P.M. (first week of the bi-week) and Monday-Friday (for second week of the bi-week).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor **Jay Patel**, can be reach on **(571) 272-2988**. The fax phone number for this group is **(571) 273-8300**.

Art Unit: 2619

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Bob A. Phunkulh/
Primary Examiner, Art Unit 2619